

Name \_\_\_\_\_

Math 1

Exam 1

For all problems, show all work. Do not round unless instructed otherwise. You may use a graphing calculator. Good luck! ☺

1. (1A) Refer to the the following information:

The speed limit on Interstate 74 across most of Illinois is 70 miles per hour. The Harrington family just left Galesburg, Illinois, and they just passed mile marker 49. There is a mile marker every mile. The Harrington family is heading towards Champaign. Thus, the numbers on the mile markers are increasing. Harry Harrington is driving, and he *refuses* to drive faster than the speed limit. On the other hand, Harry might drive slower (due to things such as traffic, bad weather, and deer stampedes). Let  $h$  be the number of hours that Harry has been driving.

Write an inequality for the number on the mile marker that the Harringtons most recently passed in terms of how long Harry has been driving.

2. (1A) Determine the value of the expression  $2x + (3y + 4z)^2$  when  $x = 3$ ,  $y = 2$ , and  $z = -1$ .

$$2x + (3y + 4z)^2$$

3. (1B) Barney Burnside drove for 201 miles. He drove an average speed of 57 miles per hour. He paid \$2.20 per gallon for gas. His car has a fuel economy of 33 miles per gallon of gas. Determine *all* quantities that Barney can deduce from this information and that are relevant to Barney's 201 mile drive.

4. (1G) Jacob, Joey, and Johnny ran two miles during cross country practice. Jacob completed his first mile in 471 seconds, and he finished the entire run in 964 seconds. Joey completed his second mile in 434 seconds, and he finished the entire run in 951 seconds. Johnny completed his first mile in 452 seconds, and he completed his second mile in 448 seconds. Make a  $3 \times 3$  matrix for the boys' times during practice, with the first column containing the times that it took each boy to run the first mile, the second column containing the times that it took each boy to run the second mile, and the third column containing the times that it took each boy to run the entire two miles.

5. (1C) The equation for the total surface area  $A$  of a cylinder with radius  $r$  and height  $h$  (with  $r$  and  $h$  in the same units) is

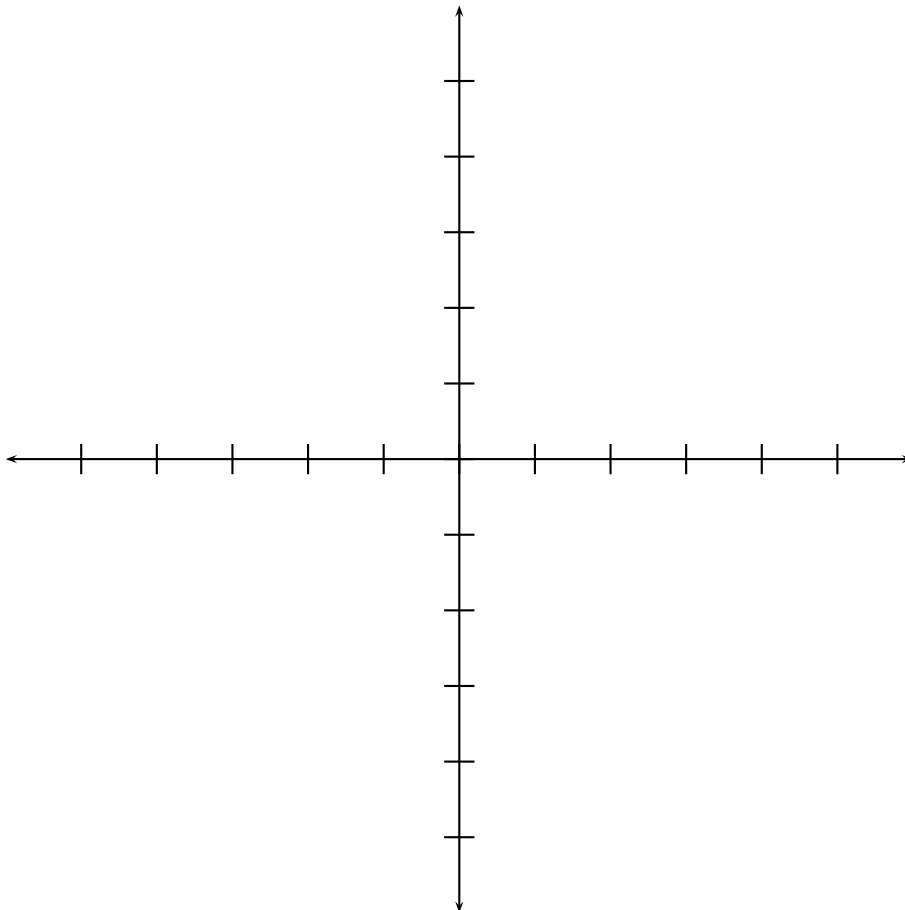
$$A = 2\pi r^2 + 2\pi rh.$$

Solve this equation for the variable  $h$ .

6. (1H) Perform the following matrix arithmetic:

$$2 \begin{pmatrix} 3 & 2 & -6 \\ 4 & -1 & 0 \end{pmatrix} - 3 \begin{pmatrix} 4 & -2 & 1 \\ 0 & 3 & -5 \end{pmatrix}$$

7. (1F) Graph the lines  $3x + y = 1$  and  $4x + 3y = -12$  on the Cartesian plane provided below. Determine the point at which these lines intersect and verify your solution algebraically.



8. (1D and 1E) Solve the inequality  $2x - 5 \leq 5x + 8$  for  $x$ , then graph your solution on the number line provided below.

$$2x - 5 \leq 5x + 8$$

